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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/760,436	01/20/2004	Stephen R. Van Doren	200313632-1	9214

22879 7590 05/23/2006

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EXAMINER	
CHERY, MARDOCHEE	

ART UNIT	PAPER NUMBER
2188	

DATE MAILED: 05/23/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/760,436	DOREN ET AL.	
	Examiner	Art Unit	
	Mardochee Chery	2188	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *20 January 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-34* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,2 and 4-34* is/are rejected.

7)☒ Claim(s) *3* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Objections

1. Claims 10 and 26 are objected to because of the following informalities: in line 3, "be" should be inserted before –reissue—and "reissue" should be changed to –reissued--.

Appropriate correction is required.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claim 2 recites the limitation "the given one of the requests" in line 2. There is insufficient antecedent basis for this limitation in the claim.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

5. Claims 1 is rejected under 35 U.S.C. 102(e) as being anticipated by Cypher (2004/0002992).

As per claim 1, Cypher discloses a system comprising: a first node employing a first cache coherency protocol [par. 7, ll 1-3]; and a detector associated with the first node that detects a condition based on responses provided by the first node to requests provided to the first node according to a second cache coherency protocol [par. 7, ll 10-16; par. 11], the second cache coherency protocol being different from the first cache coherency protocol, the first node providing a response to a given one of the requests to the first node that varies based on the condition detected by the detector [Fig. 1; par. 28, ll 1-4; par. 33].

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

7. Claims 2, 4-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cypher (2004/0002992) in view of Rowlands (2005/0251631).

As per claim 2, Cypher discloses the claimed invention as discussed above in the previous paragraphs. However, Cypher does not specifically teach the first node

provides a non-data conflict response to a source node that provides the given one of the requests to the first node, the non-data conflict response varying based on the condition detected by the detector as required by the claim.

Rowlands discloses the first node provides a non-data conflict response to a source node that provides the given one of the requests to the first node, the non-data conflict response varying based on the condition detected by the detector [pars. 10 and 74] to avoid and prevent deadlocks (par. 10).

Since the technology for implementing a system using different cache coherency protocols with a first node providing a non-data conflict response to a source node was well known as evidenced by Rowlands, an artisan would have been motivated to implement this feature in the system of Cypher in order to avoid and prevent deadlocks. Thus, it would have been obvious to one of ordinary skill in the art at the time of invention by Applicant to modify the system of Cypher to include a first node providing a non-data conflict response to a source node because this would have helped avoiding and preventing deadlocks.

As per claim 4, Rowlands discloses the detector further comprises a starvation detector that detects a starvation condition associated with a pending transaction for data at the first node employing the first cache coherency protocol [par. 74].

As per claim 5, Rowlands discloses the detector further comprises a counter that tracks a number of responses provided by the first node to the requests to the first node according to the second cache coherency protocol [pars. 66 and 69].

As per claim 6, Rowlands discloses the detector further comprises a threshold that sets the number of responses provided by the first node operative to cause the first node to provide a conflict response that causes a requesting node that provided the given one of the requests to switch from the second cache coherency protocol and to employ the first cache coherency protocol for the given one of the requests [par. 74, ll 6-12; pars. 68, 69].

As per claim 7, Rowlands discloses the first node operates in one of at least a first conflict mode and a second conflict mode while a pending transaction for data exists at the first node employing the first cache coherency protocol, the first node switching from the first conflict mode to the second conflict mode based on the condition detected by the detector [par. 10; par. 74, ll 6-12].

As per claim 8, Rowlands discloses the condition detected by the detector corresponds to a starvation condition associated with the pending transaction for the data at the first node employing the first cache coherency protocol [par. 74].

As per claim 9, Rowlands discloses the first node provides a first conflict response while in the first conflict mode which enables progression of requests provided according to the second cache coherency protocol [par. 74, ll 7-14].

As per claim 10, Rowlands discloses the first node provides a second conflict response while in the second conflict mode which causes requests provided according to the second cache coherency protocol to reissue as corresponding requests according to the first cache coherency protocol [par. 74].

As per claim 11, Cypher discloses a source node that provides the given one of the requests as a source broadcast request for data according to the second cache coherency protocol [par. 48]; and an owner node that comprises an associated cache that includes the data in a cache line having a first state that defines the owner node as an ordering point for the data [par. 8], the owner node receives the source broadcast request for the data and provides an ownership data response to the source node [par. 7], the source node filling the data in an associated cache line of the source node in response to receiving the ownership data response from the owner node, and the source node transitioning a state of the associated cache line of the source node to define the source node as a new cache ordering point for the data [par. 57; ll 14-25].

As per claim 12, Rowlands discloses the first cache coherency protocol comprises a forward progress cache coherency protocol [par. 59].

As per claim 13, Rowlands discloses the forward progress protocol comprises one of a null-directory cache coherency protocol and a directory-based cache coherency protocol [par. 47].

As per claim 14, Cypher discloses the second cache coherency protocol comprises a source broadcast cache coherency protocol [par. 7].

8. Claims 15-34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Rowlands (2005/0251631) in view of Cypher (2004/0002992).

As per claim 15, Rowlands discloses another processor node employing a forward progress cache coherency protocol for a pending transaction for the desired data [par. 59], the another processor node providing a first type of conflict response to the source broadcast request for the desired data while in a first operating mode for the pending transaction for the desired data [par. 74; ll 1-10], the first type of conflict response permitting the source broadcast request for the desired data to make forward progress according to the broadcast-based cache coherency protocol [par. 74, ll 10-15] , the another processor node switching to a second operating mode after providing at least one of the first type of conflict responses, the another processor node providing a second type of conflict response to the source broadcast request for the desired data

while in the second operating mode for the pending transaction for the desired data [pars. 11 and 74].

However, Rowlands does not specifically teach a requesting processor node that provides a source broadcast request for desired data to the system according to a broadcast-based cache coherency protocol as required by the claim.

Cypher discloses a requesting processor node that provides a source broadcast request for desired data to the system according to a broadcast-based cache coherency protocol [par. 33] to maintain coherency within the system (par. 11; ll 6-8).

Since the technology for implementing a system using different cache coherency protocols with a requesting processor node that provides a source broadcast request for desired data to the system according to a broadcast-based cache coherency protocol was well known as evidenced by Cypher, an artisan would have been motivated to implement this feature in the system of Rowlands in order to maintain coherency within the system. Thus, it would have been obvious to one of ordinary skill in the art at the time of invention by Applicant to modify the system of Rowlands to include a requesting processor node that provides a source broadcast request for desired data to the system according to a broadcast-based cache coherency protocol because this would have facilitated maintaining coherency within the system as taught by Cypher (par. 11; ll 6-8).

As per claim 16, Rowlands discloses the second type of conflict response causes the requesting processor node to employ the forward progress cache coherency protocol in connection with completing the source broadcast request for the desired data [par. 74, ll 9-18].

As per claim 17, Rowlands discloses a detector that detects a quantity of the first type of conflict responses provided by the another processor node, the another processor node switching from the first operating mode to the second operating mode based on the quantity of the first type of conflict responses detected by the detector [par. 74, ll 6-12; pars. 68, 69].

As per claim 18, Rowlands discloses the detector further comprises a starvation detector that detects a starvation condition associated with the pending transaction for the desired data at the another processor node [par. 74].

As per claim 19, Rowlands discloses the starvation detector further comprises a counter that counts the quantity of the first type of conflict responses provided by the another processor node associated with the pending transaction for the desired data [pars. 66 and 69].

As per claim 20, Rowlands discloses the starvation detector further comprises a threshold that defines the number of the first type of conflict responses provided by the

another processor node after which the another processor node will switch to the second operating mode [par. 74, ll 6-12; pars. 68, 69].

As per claim 21, Rowlands discloses each of the first type of conflict response and the second type of conflict response comprises a respective non-data conflict response [pars. 10 and 74].

As per claim 22, Cypher discloses an owner processor node that comprises an associated cache that includes the desired data in a cache line having a state that defines the owner processor node as a cache ordering point for the data [par. 48], the owner processor node providing an ownership data response to the source broadcast request for the desired data [par. 8], the requesting processor node filling the desired data in an associated cache line of the requesting processor node in response to receiving the ownership data response from the owner node [par. 7], and the requesting processor node transitioning a state of the associated cache line of the requesting processor node to define the requesting processor node as a new cache ordering point for the data [par. 57; ll 14-25].

As per claim 23, the rationale in the rejection of claims 15 and 18 is herein incorporated.

As per claim 24, Rowlands discloses the first cache coherency protocol comprises a forward progress cache coherency protocol [par. 59].

Cypher further discloses the second cache coherency protocol comprises a source broadcast protocol [par. 7].

As per claim 25, the rationale in the rejection of claim 16 is herein incorporated.

As per claim 26, Rowlands discloses second type of conflict response causes the at least one request for the line of data to reissue employing the first cache coherency protocol [par. 74].

As per claim 27, the rationale in the rejection of claim 18 is herein incorporated.

As per claim 28, the rationale in the rejection of claims 19 and 20 is herein incorporated.

As per claim 29, the rationale in the rejection of claims 15 and 17 is herein incorporated.

As per claim 30, Rowlands discloses the predetermined condition corresponds to a starvation condition associated with the pending transaction at the target node [par.

74].

As per claim 31, Rowlands discloses the method further comprising counting the first type of conflict responses provided from the target node and providing the second type of conflict response after the predetermined number of the first type of conflict responses have been provided, the counting providing an indication of the starvation condition associated with the pending transaction at the target node [pars. 66 and 69].

As per claim 32, the rationale in the rejection of claim 24 is herein incorporated.

As per claim 33, the rationale in the rejection of claim 25 is herein incorporated.

As per claim 34, the rationale in the rejection of claim 26 is herein incorporated.

Allowable Subject Matter

9. Claim 3 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Mardochee Chery whose telephone number is (571) 272-4246. The examiner can normally be reached on 8:30A-5:00P.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Manonama Padmanabhan can be reached on (571) 272-4210. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

April 14, 2006

Mardochee Chery
Examiner
AU 2188

4/17/06

MANO PADMANABHAN
SUPERVISORY PATENT EXAMINER